

The Importance of Trust for Interface Quality and Acceptance

Citation for published version:

Raeseide, R, Peisl, T & Canduela, J 2019, The Importance of Trust for Interface Quality and Acceptance. in A Walker, R O'Connor & R Messnarz (eds), Systems, Software and Services Process Improvement: 26th European Conference, EuroSPI 2019, Edinburgh, UK, September 18–20, 2019, Proceedings. Communications in Computer and Information Science, vol. 1060, pp. 672-681. https://doi.org/10.1007/978-3-030-28005-5_52

Digital Object Identifier (DOI):

[10.1007/978-3-030-28005-5_52](https://doi.org/10.1007/978-3-030-28005-5_52)

Link:

[Link to publication record in Heriot-Watt Research Portal](#)

Document Version:

Peer reviewed version

Published In:

Systems, Software and Services Process Improvement

Publisher Rights Statement:

This is a post-peer-review, pre-copyedit version of an article published in Systems, Software and Services Process Improvement, 26th European Conference, EuroSPI 2019, Edinburgh, UK, September 18–20, 2019, Proceedings. The final authenticated version is available online at: https://doi.org/10.1007/978-3-030-28005-5_52

General rights

Copyright for the publications made accessible via Heriot-Watt Research Portal is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

Heriot-Watt University has made every reasonable effort to ensure that the content in Heriot-Watt Research Portal complies with UK legislation. If you believe that the public display of this file breaches copyright please contact open.access@hw.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.

The Importance of Trust for Interface Quality and Acceptance

Raeside, Robert¹, Peisl, Thomas² and Canduela, Jesus³

^{1,3} Edinburgh Business School, Heriot Watt University, Edinburgh, UK

² Munich University, Department of Business Administration, Munich, Germany
r.raeside@hw.ac.uk

Abstract. As digital interfaces become common for their development and to offer a sustainable bridge between devices and users, trust in the interface is essential. In this paper we undertake a multi-method research to show from experiment results various dimensions of trust. The results confirm that trust is indeed necessary by so if raising and keeping the user interest and technical competence in the interface design and operation.

Keywords: Trust, Interface Quality and Acceptance, Technology acceptance

1 Introduction

Mobile computing and transactional digital interfaces have become ubiquitous. Many are launched but only some have a life cycle for more than a few months and even fewer become profitable. Why should this be? Like most innovations for most the answer lies in bad planning, revolving around failing to secure an income stream, lack of understanding of the market, technical and security failures and inability to formulate a feasible and resourceable growth strategy. In short, the concept is flawed – but not all failures fall into this category. A significant proportion of failures to establish a sustainable position fail not because of a poor product or a weak concept but because potential users do not trust the product or service. Failure to appear as trustworthy means a lack of early adoption and knowledge of a new and potentially useful interface. One of the important channels of communication is electronic word of mouth frequently supported by blogs and blogger sites. It seems that if a company engages in successful electronic word of mouth marketing the emphasis is on the emphasising benefits of the interface and its technical features, but potential adopters also need assurance that the interface is secure and reliable i.e. can they trust it. See Amblee and Bui (2011), Brown et al. (2007) and Daugherty and Hoffman (2014).

From research we have undertaken in to what makes crowdfunding campaigns successful (Peisl, Raeside and Selen, 2016) we can generalise our findings and consider how businesses that rely on apps and digital interfaces need to give attention to trust in marketing their products. We begin with a review of why trust is essential to the success of digital interfaces and precise the findings of our studies on crowdfunding. From this we propose a concept and forward recommendations to those formulating plans for a trustworthy digital interface.

2 Trust

Trust can be considered a multi-element entity including benevolence, integrity, competence, openness, reliability and intention. Benevolence can be thought of as the willingness to support the entrepreneur because of the utility derived by the investee in giving help (Mayer, Davis, and Schoorman, 1995). Deutsch (1973:537) summarised benevolence as “on the trustee or trustor side to increase the wellbeing of the other person”. Another required dimension, according to Levin et al. (2003), is that of integrity, which, can be seen as a degree of fairness and is described by the authors as “rules that are applied equally to individuals” (Levin et al., 2003:69). Other authors use integrity similar to the other trust dimensions which include honesty, openness, concern and competence (Diez, 2003; Mühl, 2014). Competence is explained by Mayer, Davis, and Schoorman, 1995) as having a high and adequate level of qualification combined with the capability to perform in a specific role. Other researchers describe the term more as a combination of skills, knowledge, education and social behaviour, which is used to improve performance (Levin et al., 2003). Others such as Reichelt (2013) refer to this as credibility. The suggestion is that in conditions where a high level of competence is crucial, a trustor might be less willing to trust the trustee if their competency is not assured, and the trustee perceives greater risk (Levin et al., 2003). Openness according to Mühl (2014) indicates some similarities to empathy, integrity and being concerned. Mayer, Davis and Schoorman (1995) describe this term rather as the ability changes the point of view to another perspective. Reliability is expressed as the degree of reliability of the trustee (Mühl, 2014). Levin et al. (2003) describes the term as being consistent with word and deed. Tomkins (2001) and Kramer and Cook (2004) came up with similar ideas about reliability by proposing that trust increases through learned, interactive experiences between two parties. Intention is the level of intended performance of action of the trustee towards the trustor (Mayer, Davis and Schoorman, 1995). Rousseau et al. (1988) investigated that positive beliefs of the intention of another person will directly lead to a higher level of trust. The notion of building trust as Gefen et al. (2003) pointed out is vital to ensure acceptance of a technology.

As a basis for our conceptualisation we used the trust model from Mayer, Davis, and Schoorman (1995) to investigate the role of trust. In this model the outcome is taken to be the success or failure of the crowd funding campaign. To this model we propose that interest in, excitement by and emotional response to the crowdfunding interface affects the perceived trustworthiness of the crowdfunding video and also directly affects the outcome.

In our use case on crowdfunding campaigns securing an investment is dependent on trust being established in a triadic relation between the entrepreneur as the campaign initiator, the digital interface (i.e. the platform) and the user, i.e. the campaign backer. Initially this relation is not stable, as there is no direct link between the initiator and the user. The interaction with the initiator is through the digital interface, and the campaign initiator can only effectively interact with the user via the interface. Thus, the interface is powerful as the connecting bridge but this link will only be effective if it is technically sound and is trusted by both the user and the initiator.

We argue for the business to be sustained that there is a need to create a direct link from the initiator to the user. But for this to happen the provider of the digital interface has to relinquish some power to allow a stable triadic relation to be formed. For this to happen trust needs to be established amongst all parties, (Labrecque, 2014 and Vohra and Bhardwaj, 2017).

Hence, for the interface quality and acceptance the user must be interested, have positive emotions and be excited about the product or service. As a consequence, the interface needs to support and build assurance of trust in both user and the initiator. This we conjecture requires the interface has to have a professional look, is secure, reliable and easy to use.

3 The Experiment

To investigate these postulations we undertook a multi-method experimental approach to determine quality and acceptance expectations for the interface. The digital interfaces we examined in the experiment were crowdfunding platforms. To undertake this, users with experience in crowdfunding campaigns, ie. participated in more than five ventures, were recruited and asked to complete a survey using survey monkey. Twenty-six people voluntarily participated after giving informed consent, (no incentives were given). For these 55% were female and 10% were aged under 21 years, 60% were aged between 21 to 35 years and 30% were aged over 35 years. The demographics of the sample reflects Geber et al.'s (2012) view of those who browse crowdfunding sites as they suggest that browsers tend to be college graduates, are aged less than 35 years and have no children.

The participants engaged in the experiment to allow different factors of digital interfaces to be evaluated relative to one another. First participants were asked about their experience and to report of the importance of digital interfaces design using a 1 to 5 Likert scale. Then the respondents were asked to rate trust based on six dimensions: reliability, intention, integrity, competence, benevolence and openness in regard of the importance of trust. Next, an experimental approach, a conjoint analysis (Dauda and Lee 2015, See-To and Ho 2016) was applied to understand trade-offs between the four factors: trust, professional design, security and cost in relation to the respondent's likelihood of investing in the crowdfunding project. The conjoint analysis was used to evaluate the participants' action probability. In the conjoint experiment different combinations of the factors in terms of combinations of low, medium and high levels of the four variables were presented and participants asked to score the value of the combination in terms of their likelihood to invest in the project. To present the choices to the participants a fractional factorial design was taken from the Taguchi arrays and an L9 array (Green and Srinivasan 1990, Kacker et al. 1991, Orme 2005) was taken to allow the four factors to be assessed at three levels. This design was chosen so as not to be too burdensome to participants but would still allow exploration of the key factors. Each respondent scored the combination on a scale zero to ten.

Next the respondents were asked to score out of five how well two digital interfaces scored in the factors of ease of navigation, empathy interest/intention, design, competence, integrity and, as output factors benefit/funding and trust.

Building on the survey findings a series of four experiments were undertaken. In each experiment six videos were viewed individually by participants, three of the videos were from successful campaigns and three were from unsuccessful campaigns. The videos were of different lengths, defined as; short, medium and long video. A short video is less than 1:30 minutes, medium is between 1:30 and 3:00 minutes and long is over three minutes. This was because in a pilot study it was found that video length seemed to be an important predictor of success and hence, we wished to control for video length in the main study.

Before participants viewed the videos their gender, age, how often had they had ever denoted to crowdfunding projects, and if they had worked on launching a crowdfunding project were noted. We also made crude and simple measures of their risk adverseness and how trusting they were on others by asking participant to rate these concepts on a scale from 1 to 10, where 10 corresponds to high.

To measure interest, emotion and excitement of the participants we used the imotions software (2019) which is software loaded on to a laptop which measures six emotions from physical facial characteristics of the participant, via the laptop camera, (see McNeill et al. 2018). This returns measures of surprise, joy, sadness, anger, fear and disgust. The software also tracked the viewers eyes when they viewed the video recording pupil size, pupil size rate of change, gaze and fixation on a particular spot. The first two measures we equated with excitement and the latter two measures we associated with interest. For each individual video combination, we computed the means of these measures.

Finally, we used two measures of a successful outcome; whether or not the campaign was successful and the degree to which participants stated that they would back the campaign. This last measure was computed by taking the mean of the two questions “would you recommend the product?” and “would you invest in the product?” These outcome measures we considered to be proxies for engagement.

The videos were selected from the ‘almost finished’ section of Kickstarter’s ‘Food and Drink’ category as we felt it was of broad interest to a range of different people. We also felt that the content of the videos would be easier to understand, as opposed to a more specialist category such as ‘Technology’. We assumed that a video was successful if it had already achieved it’s funding objective. We assumed also that if a video was less than 5% funded, while in the almost finished section then it was going to be unsuccessful. The respondents were shown an edited version of Kickstarter’s campaign page, which showed only the campaign video, campaign title and the amount of money the campaign wished to raise. The order of the campaigns was randomised.

4 Findings

Following our postulations participants were first asked to assess their general trust in others. The mean scores out of 100 was 64, the scores ranged from 25 to 91. Females on average expressed more trust than males, but the difference was not statistically

significant. Eighty four percent of the respondents gave scores greater than 50 (neutral level) that others could be trusted. Thus, an interpretation is that in general people are predisposed to trust.

From the conjoint experiment to assess the relative importance of trust, professional look, security and cost. The part worth of these factors is illustrated in Figure 1. From this, it is clear that high trust, professional look and security along with low cost are preferred.

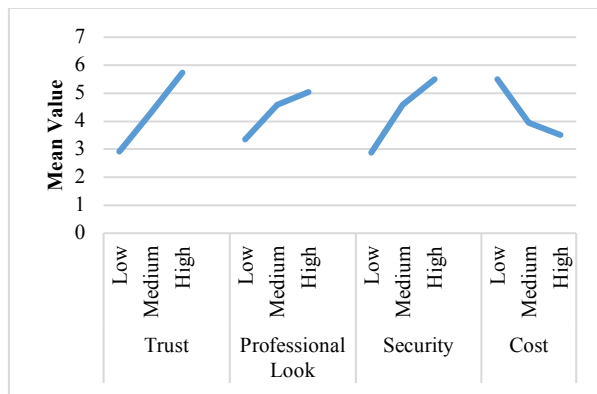


Fig. 1. The part worth scores for levels of each factor

Examining the relative importance of the factors it appears that trust is the most important at 33% followed by security and cost each having a relative importance of 28% and then professional look has a lower relative importance at 16%. Hence to engage with an app it is suggested that gaining trust is of prime importance closely followed by transaction cost ensuring security. Professional look although important is of less importance than the other factors.

The participants were then asked to score out of five the importance of different technical attributes of digital interfaces in order to gain an understanding of the user experience, displayed in Figure 2.

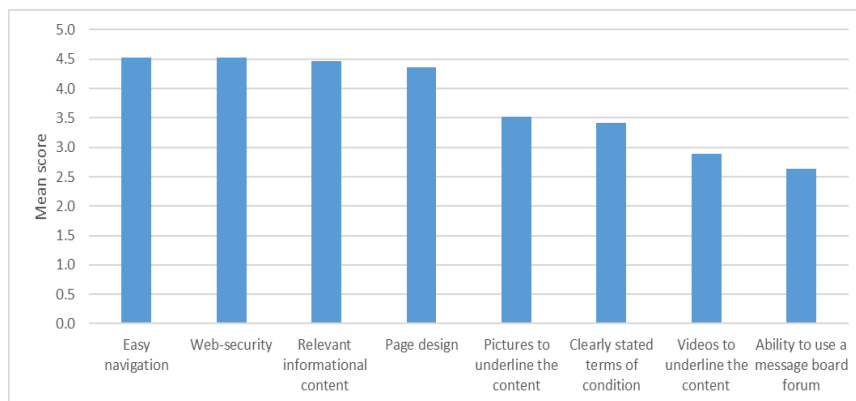


Fig. 2. Importance of digital interface attributes

Finally, participants were asked to evaluate the two cases of crowdfunding platforms. Two experience dimensions, (ease of navigation and benefits) as well as four trust dimensions were selected based on research by Mühl (2014). In addition, we added two output measures, benefit/funding and trust. The mean scores given by participants are given in Figure 3.

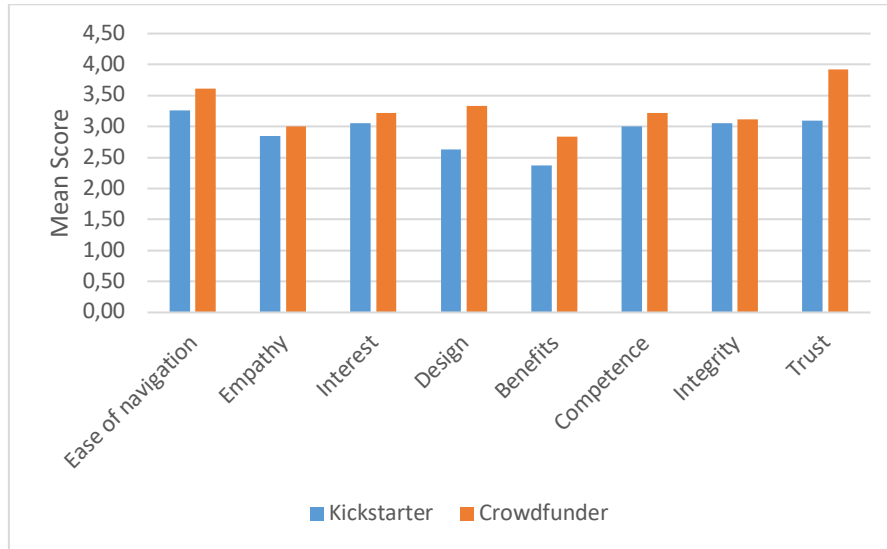


Fig. 3. Means scores of evaluations of crowdfunding intermediaries

For the experiments using the imotions software the mean and 95% confidence intervals for propensity to trust and risk adverseness were found to be 7.10 (6.68 to 7.310 and 5.44 (5.00 to 5.80) respectively. To assess the nature of the relationship between participants rating of ability, benevolence and integrity of the crowdfunding video and the outcomes the relation to the actual outcome coded as success or failure was assessed using an independent t test. The results as well as the outcome prediction was also compared to the actual outcome in Table 1.

Table 1. Means of perceived trust factors and likely to back score by observed outcome.

Measure	Success	Failure	P value
Ability	5.64	4.08	<0.001
Benevolence	5.38	4.99	0.205
Integrity	6.51	6.16	0.347
Likely to back product	2.91	2.10	0.002

Although all the trust factors had higher means when the outcome was a success compared to those when the outcome was a failure, only ability showed a statistically significant difference. Although the participants likelihood to back the product was low the mean for success was significantly higher than that for failure. The Pearson product moment correlation coefficients between likely to back the campaign and ability, benevolence and integrity were 0,649, 0.289 and 0.335 respectively, all these positive correlations were statistically significant ($P < 0.001$).

To investigate the association between the perceived trust factors, interest, emotion and excitement Pearson correlations will be computed. But first we need measures of emotion and excitement. We applied factor analysis with varimax rotation to the variables generated by the imotion software, (excluding the measure of fear). The resulting factor loading are displayed in Table 2. The measures loaded on to four factors which explained 74% of the original variation in the imotion measures. We labelled these factors as interest, negative emotions, positive emotions and excitement.

Table 2. Factor Loadings

Measure	Interest	-ve emotion	+ve emotion	Excitement
fixation_on_video	.935			
gaze_on_video	.911			
sadness		.875		
anger		.840		
joy			.803	
surprise			.752	
pupil_size				.771
pupil_change				.769
Percentage of variation accounted for	24.1	18.5	16.4	15.8

These factors were then correlated with the measures of perceptions of trust and the correlation coefficients are shown in Table 3. Interest is positively and significantly correlated with the perceptions of trust, but emotional factors are found to have little correlation with perceptions of trust. Only positive emotions displayed a significant correlation which is a negative correlation with integrity. For excitement the only significant correlation is with ability which was negative suggesting if the video is perceived as exciting then perceptions of ability of the campaign are low. As the participants were asked directly the degree to which they were interested in the video this measure was correlated with the derived factor of interest, the correlation was

positive but low although it was significant ($r = 0.231$; $P = 0.022$). This suggests that the derived measure of interest is not as valid as one would like. The direct measure of interest did correlate more strongly with the perceptions of trust than the derived measures.

Table 3. Correlations of Factors and perceptions of trust and likelihood to back the campaign.

Factor	Benevolence	Ability	Integrity	Likely to back the campaign
Interest	.328**	.379**	.270**	.403**
Negative emotion	-.122	.001	-.098	-.077
Positive emotion	.008	-.095	-.155*	.019
Excitement	.076	-.214**	-.139	-.204**
Participant reported level of interest	.321**	.601**	.274**	.690**

** . Correlation is significant at the 0.01 level

* . Correlation is significant at the 0.05 level

The associations of the factors with outcomes are now tested. Interest, no matter how measured is significantly positively correlated with the likelihood to back the campaign at the 1% level, (see Table 3). Emotion did not display any significant correlation with backing the product, while excitement is found to be negatively correlated with the likelihood of backing the product at the 1% level. These findings are confirmed when the means of the factors and reported interest with the observed outcomes are computed. These are displayed in Table 4 along with independent t test P values.

Table 4. Means of factors and observed outcomes of the campaign.

Factor	Success	Failure	P value
Interest Factor	0.239	-0.223	0.001
Reported interest	4.067	2.833	0.001
Negative emotion	-0.039	0.037	0.595
Positive emotion	-0.034	0.032	0.643
Excitement	-0.015	0.014	0.838

To ensure that there were no systematic differences between experimental groups or with the order of viewing the video, (one might think that after viewing several campaigns the participant might lose interest and give rushed and unthoughtful responses) a two-way analysis of variance was conducted with the derived variables of back the campaign, integrity, negative emotion, positive emotion and excitement. No evidence of systematic variation between experimental groups was observed and nor

was there any evidence that participants were systematically changing their responses with the order of viewing.

The findings from the experiment showed that for most variables the measures were reliable, as illustrated in Table 1. The emotional measures were not well defined as for most of the six measures the mean values are low and considerably less than the standard deviation of the measure. This casts doubt on the validity of the emotional measurement of the imotions software, but it is also conceivable that emotion is not a large component of crowdfunding videos. This is especially so as the crowdfunding interface will act as a moderator to ensure good taste. Also, it is difficult to conceive that someone seeking funding would engender disgust and fear amongst potential investors. Given the emotion of fear recorded the lowest values we dropped this from our investigation.

Jiang, Yin and Liu (2019) confirm our experimental approach to understand the phenomena of different experiences leading to certain behavior when an individual interacts with a digital device. Despite initial results we need a more in-depth study to provide a solid model and, hence, lessons learned.

5 Conclusions and Further Research

From the analysis of the results and the presentation of findings, the authors generate recommendations of how to improve the perception of trust and this in turn should increase the likelihood of successful funding. The results also confirm it is more and more important to focus on new qualities for all software applications to ensure benefits for users and other stakeholders, ie. to shift from a logical and cognitive programming to emotional issues in the interface between humans and electronic devices.

This study on the crowd to intermediary interface has confirmed that ensuring trust is the main requirement of the portal to engage the crowd. However, ease of navigation, design and competence are also important to get the crowd to perceive the digital intermediary as trustworthy. The feeling of trust is developed through integrity, competence, intention, openness, reliability and removing concern from the transaction. The study also suggests that benevolence is important but to a lesser degree than the other components of trust. Thus, instilling feelings of trust and ensuring that this trust is supported by interest in the product or service and technical competence of the interface is essential.

Further research areas include an in-depth study of individual campaigns to identify distinguishing characteristics of video sequences leading to success or failure, and how this can be transferred into a conceptual framework for the design of a trustworthy interface. Another option is in applying our findings to business model innovation providing an additional aspect to the increasing interest in business designs and the shift towards services in manufacturing and automotive.

While the contribution to practice is limited at the moment the discussion has started by providing new insights into the how and why an understanding of interfaces leads to higher quality and trust and, hence, a higher acceptance.

References

1. Amblee, N., Bui. T. (2011). Harnessing the Influence of Social Proof in Online Shopping: The Effect of Electronic Word of Mouth on Sales of Digital Microproducts, *International Journal of Electronic Commerce*, Vol.16, No.2, pp.91-114.
2. Brown, J., Broderick, A.J., Lee, N. (2007). Word of Mouth Communication within Online Communities: Conceptualizing the Online Social Network, *Journal of Interactive Marketing*, Vol.21, No.3, pp.1-19.
3. Dauda, S. and Lee, J. (2015). Technology adoption: A conjoint analysis of consumers' preferences on the future online banking services, *Information Systems*, 53: 1-15.
4. Daugherty, T., Hoffman, E. (2014). eWoM and the importance of capturing consumer attention within social media, *Journal of Marketing Communication*, Vol.20, No.1-2, pp.82-102.
5. Deutsch, M. (1973). *The resolution of conflict*. New Haven, CT: Yale University Press.
6. Diez, M., J., (2003). *Framing Europe*, Princeton, NJ: Princeton University Press
7. Gerber, E., Hui, J., Kuo, P. (2012). Crowdfunding: Why People are Motivated to Post and Fund Projects on Crowdfunding Platforms. *Computer Supported Cooperative Work 2012, Workshop on Design Influence and Social Technologies: Techniques, Impacts and Ethics*, Seattle, WA.
8. Gefen, D., Karahanna, E., Straub, D. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly*, 27(1), 51-90.
9. Green, P., Srinivasan V. (1990). Conjoint Analysis in Marketing: New Developments with Implications for Research and Practice, *Journal of Marketing* 54: 3-19.
10. imotions (2019). Biometric Research Simplified, <https://imotions.com/>
11. Jiang, L., Yin, D. and Liu, D. (2019). Can Joy Buy You Money? The Impact of the Strength, Duration, and Phases of an Entrepreneur's Peak Displayed Joy on Funding Performance. *Academy of Management Journal*; DOI: 10.5465/amj.2017.1423
12. Kacker, R., Lagergren, E. and Filliben, J. (1991). Taguchi's fixed-element arrays are fractional factorials, *Journal of Quality and Technology*, 23(2) 107-116.
13. Kramer, R., Cook, K. (2004). *Trust and Distrust in Organizations: Dilemmas and Approaches*. New York: Russel Sage Foundation
14. Labrecque, L. (2014). Fostering Consumer-Brand Relationships in Social Media Environments: The Role of Parasocial Interaction, *Journal of Interactive Marketing*, Vol.28, No.2, pp.134-148.
15. Levin, D., Cross, R., Abrams, L., Lesser, E. (2003). Nurturing interpersonal trust in knowledge sharing networks. *Academy Management Review*, 17(4), 64-76.
16. Mayer, R., Davis, J., and Schoormann, D. (1995). an Integrative Model of Organizational Trust. *The Academy of Management Review*, 3, 709- 734.
17. McNeill, M., Lawson, A., Raeside, R. and Peisl, T. (2018). Get your Project Funded: Using Biometric Data to Understand What Makes People Trust and Support Crowdfunding Campaigns, *Proceedings of the 32nd International BCS Human Computer Interaction*, Belfast, July 4th-6th, 2018.
18. Mühl, J. (2014). *Organizational Trust: Measurement, Impact, and the Role of Management Accountants*. UK: Springer.
19. Orme, R., (2005). Accuracy of HB Estimation in MaxDiff Experiments, Sawtooth Software Research Papers Series, www.sawtoothsoftware.com.
20. Peisl, T., Raeside, R. and Selen, W. (2016). Predictive Crowding and Disruptive Innovation: How to effectively leverage crowd intelligence, *Journal of New Business Ideas & Trends*, 14(2): 23-41.

21. Reichelt, J., Slevert, J., Jacob, F. (2013). How credibility affects eWOM reading: The influences of expertise, trustworthiness, and similarity on utilitarian and social functions. *Journal of Marketing Communications*, Vol. 20, no. 1–2: 65–81.
22. Rousseau, D., Sikins, S., Burt, R., Cramerer, C. (1998). Not so different after all: a cross-discipline view of trust, *Academy Management Review* (23), 393-404.
23. See-To, E. W. K. and Ho, K. K. W., (2016). A Study on the Impact of Design Attributes on E-Payment Service Utility, *Information & Management*, 53(5): 668-681.
24. Tomkins, C. (2001). Independencies, trust and information in relationships, alliances and networks. *Accounting, Organizations and Society*, 34, 161-191.
25. Vohra, A., Bhardwaj, N. (2017). From active participation to engagement in online communities: Analysing the mediating role of trust and commitment, *Journal of Marketing Communication* (online) <https://doi.org/10.1080/13527266.2017.1393768> (accessed 18.06.18)